Check List the journal of biodiversity data

LISTS OF SPECIES

Check List 11(5): 1760, 4 October 2015 doi: http://dx.doi.org/10.15560/11.5.1760
ISSN 1809-127X © 2015 Check List and Authors

A contribution to the checklist of fishes of San Luis province, Argentina

Yamila P. Cardoso[1*], **Sergio Bogan**[2], **Juan M. Meluso**[2], **Adrián Jáuregui**[3], **María B. Cabrera**[1] and **Marta Lizarralde**[4]

1 Instituto de Investigaciones Biotecnológicas-Instituto Tecnológico Chascomús (IIB-INTECH), Av. Intendente Marino Km 8,200 CC 164 (7130) Chascomús, Buenos Aires, Argentina
2 Fundación de Historia Natural "Félix de Azara". Departamento de Ciencias Naturales y Antropología. Universidad Maimónides. Hidalgo 775 piso 7 (1405BDB). Buenos Aires, Argentina
3 Sección Ornitología, División Zoología Vertebrados, Museo de La Plata, Facultad de Ciencias Naturales y Museo. Paseo del Bosque s/nº B1900FWA-La Plata
4 Centro Austral de Investigaciones Científicas, CADIC - CONICET, Av. Houssay 200. 9410 Ushuaia, Tierra del Fuego Argentina
* Corresponding author. E-mail: yamilapcardoso@gmail.com

Abstract: San Luis province presents arheic and endorheic basins that are poorly understood in terms of their ichthyological composition. The samples taken recently from the main basins of this province have yielded data of undisputed biogeographic value for the knowledge of the ichthyofauna of San Luis, as well as for drawing up lists of species for watersheds with poor or absent previous records. Here, we cite *Jenynsia multidentata* from the Desaguadero and Bebedero rivers, *Cnesterodon decemmaculatus* for Chorrillos River, and *Oligosarcus jenynsii* for Luján, Quines and Quinto rivers. We add five taxa to the Nogolí River that have not been previously reported. We also present for the first time a list of the fish fauna from the Conlara, Luján and Quines basins. Our results provide 34 new records of freshwater fish distribution.

Key words: San Luis, ichthyology, biogeography, diversity, Luján River, Quines River, Argentina

INTRODUCTION

The Sierras de San Luis are the most important rock mass in the homonymous province in the center of Argentina. These sierras are the origins of most of the provincial waterways (Ceci and Cruz Coronado 1981). San Luis province has arheic or endorheic watercourses. An exception is the Desaguadero-Salado river system, whose headwater is in the Cordillera de los Andes and sporadically drains into the Colorado River.

San Luis has a low hydrological regime that carries out intensive water management actions, so that current basins are highly modified with reservoirs, aqueducts and canals that generate large water mirrors reservoirs. Some of these water mirrors promoted the introduction of sport value fish species (Menu-Marque et al. 1983). In most cases, the greater part of the runway of these large dams are almost dry, fragmenting fluvial environments, affecting the aquatic biota and restricting the distribution of the species to the headwaters of watersheds (Garelis and Bistoni 2010).

The first contributions to the knowledge of the San Luis fish fauna were by MacDonagh (1948), Ringuelet et al. (1967), and Ringuelet (1975). They considered the distributional and systematic data of many species that inhabit this province. Menni et al. (1984) provided a list of fish species in northwestern San Luis province, while Ferriz (1996) added a series of records from the basin of the Quinto and Nogolí rivers. Garelis and Bistoni (2010) provided a detailed study of the Quinto River, providing new records for this basin as well. Recently, Nadalin et al. (2015) published a list of species of San Luis province based on bibliographic data.

Previous works (Ringuelet 1975; Arratia et al. 1983; López et al. 2002) included San Luis in the Brasil Subregion of the Paranense Domain. According to López et al. (2008), San Luis province is divided in two different biogeographic provinces: Pampeane and Andine-Cuyane.

The aim of this contribution is to present the results of the sample work conducted recently in several localities of San Luis province. Even though collections were made during a short period of time, they have provided data of undoubted biogeographical importance for the knowledge of the ichthyofauna, as well as drawing up lists of species for watersheds with little or no previous records.

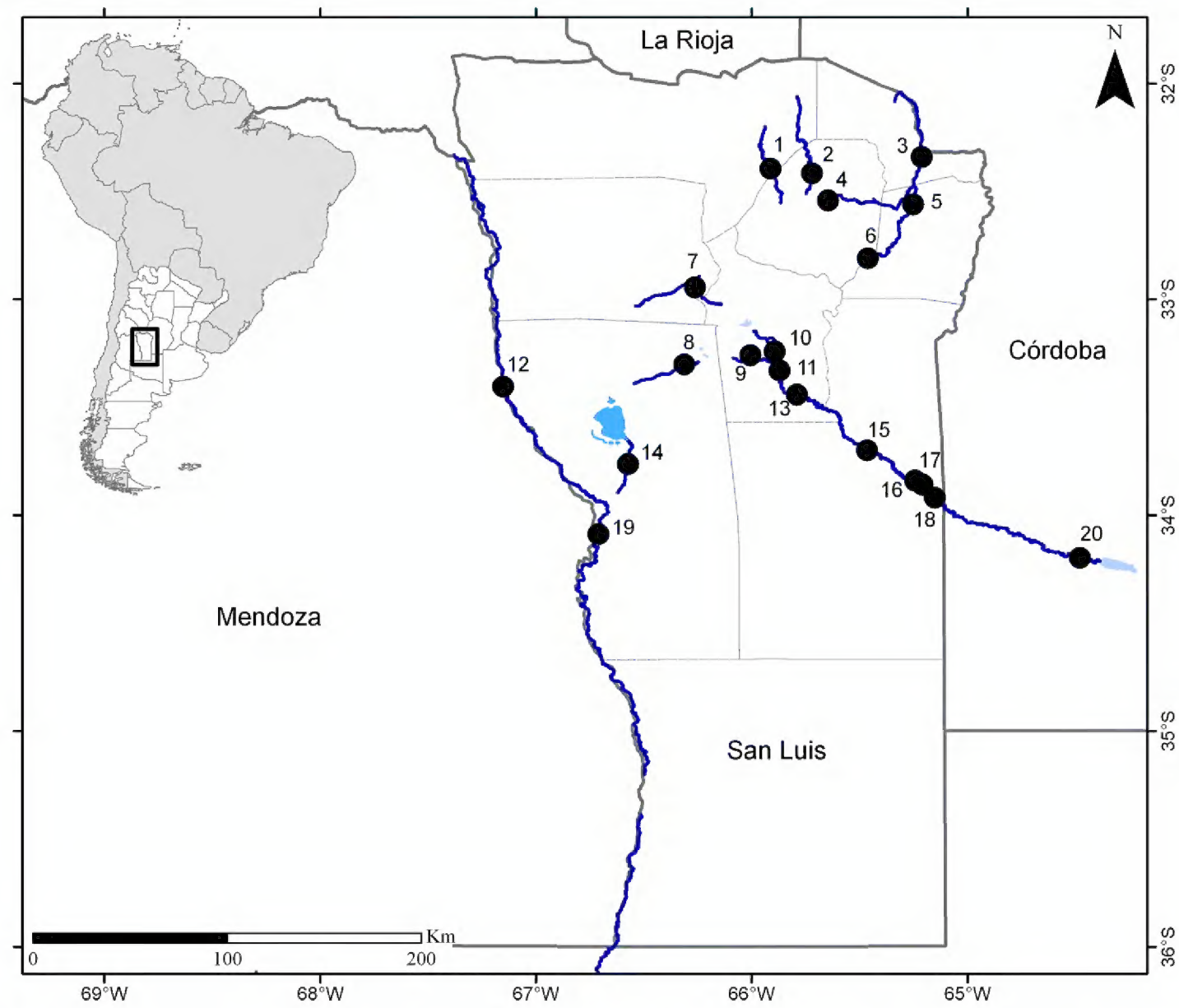

Figure 1. Map showing the sampling localities in San Luis and Córdoba provinces, 1: Luján River downstream of Luján Dam; 2: La Huertita Dam; 3: Conlara River in Santa Rosa de Conlara; 4: Guanco Pampa stream near Villa Praga; 5: Conlara River in Concarán; 6: San Felipe Dam; 7: Nogolí River; 8: Chorrillos River in San Luis City; 9: Stream that flows into the dam Paso de las Carretas in route 20; 10: Quinto River and route 20; 11: Paso de las Carretas Dam; 12: Desaguadero River and route 7; 13: Quinto River and route 27 near Fraga; 14: Bebedero River and route 11 near Beazley; 15: Quinto River in Villa Mercedes; 16: Quinto River and route 11; 17: Quinto River in Justo Daract; 18: Quinto River and route 14; 19: Desaguadero River and route 146, 20: Quinto River near Villa Sarmiento, Córdoba.

MATERIALS AND METHODS

Sampling was conducted in 19 different localities of San Luis province, Argentina (Figure 1), during November of 2014. To obtain the specimens, we used trammel nets, traps, trawl nets, and flakes. The permits to collect were granted by Programa Biodiversidad, Ministerio de Medio Ambiente de la Provincia de San Luis (Argentina). Samples were fixed in formalin and preserved in alcohol 70% in the Fundación de Historia Natural Félix de Azara (CFA-IC) fish collection.

RESULTS

Seventeen fish species from fifteen genera and eight families were recorded in San Luis province. Photos of fish species are shown in Figures 2–6.

Desaguadero–Salado Basin

The headwaters of this basin are in the Cordillera de los Andes, in northwestern La Rioja province. The course then enters San Juan province, where it is known as the Bermejo River. After overcoming the Guanacache lagoons, it changes its name to Desaguadero River. There, it forms the boundary between Mendoza and San Luis provinces, where it receives the Tunuyán and

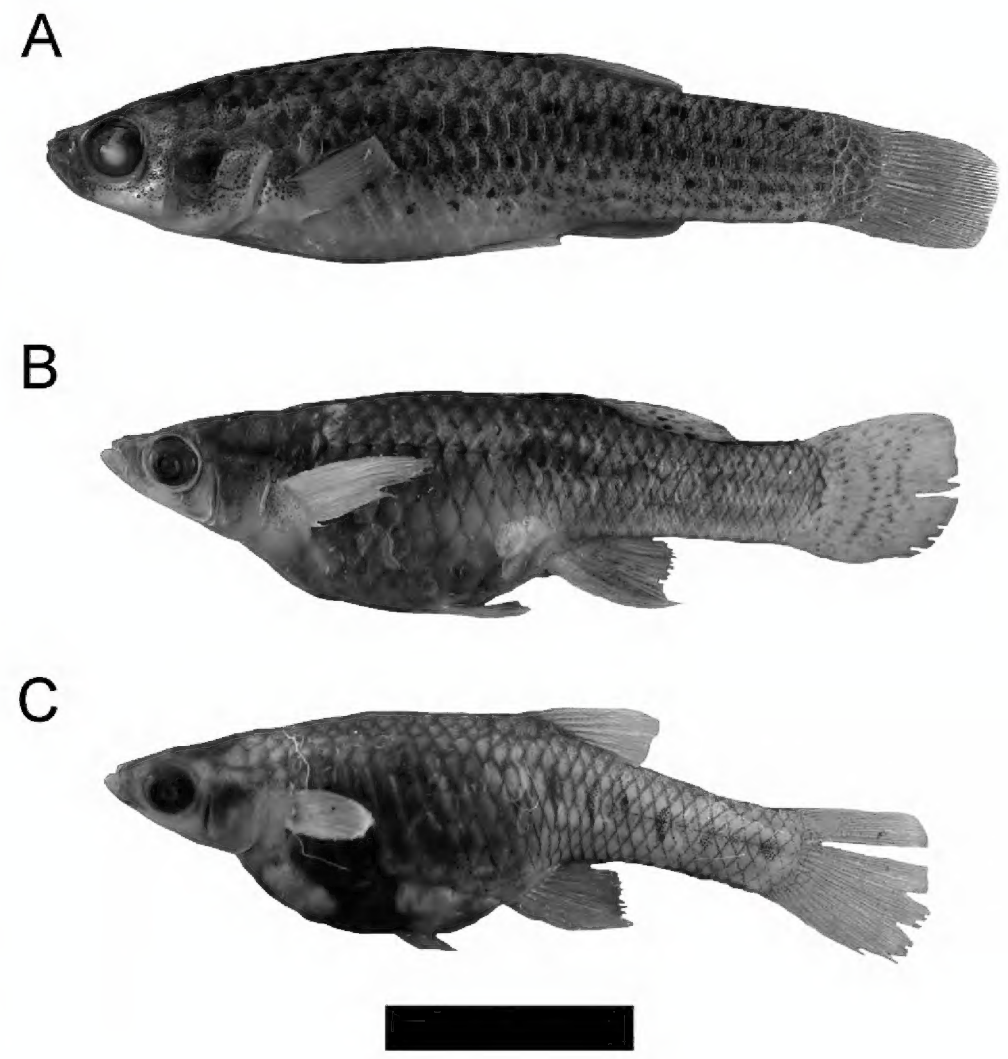

Figure 2. A: *Jenynsia multidentata* from Desaguadero River (CFA-IC-3840). **B:** *Gambusia affinis* from Quinto River (CFA-IC-3886). **C:** *Cnesterodon decemmaculatus* from Quinto River (CFA-IC-3887). The scale is 1 cm.

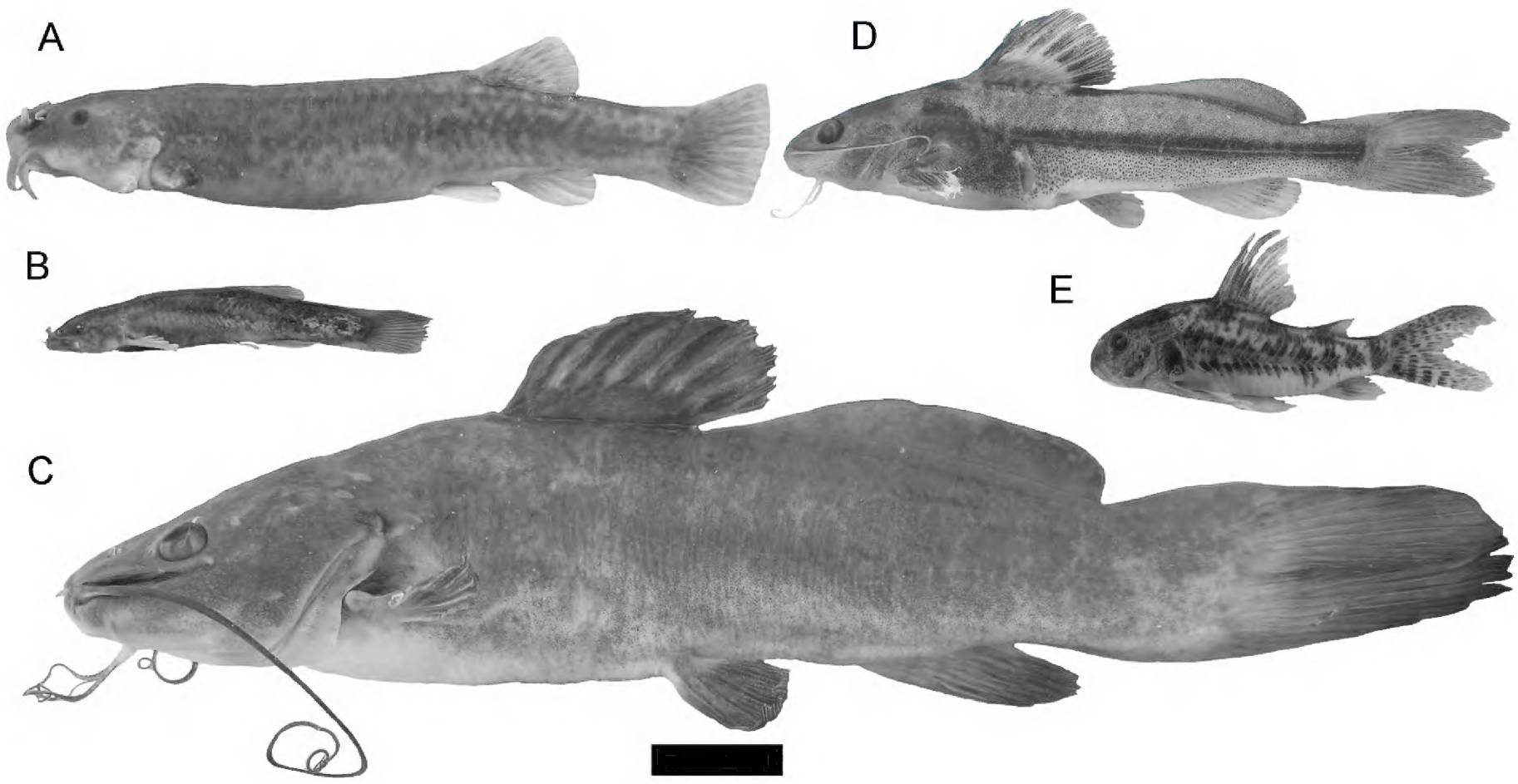

Figure 3. A: *Trichomycterus corduvensis* from Quinto River (CFA-IC-3889). **B:** *Trichomycterus tenuis* from San Luis River (CFA-IC-3972). **C:** *Rhamdia quelen* from Conlara River (CFA-IC-3899). **D:** *Pimelodella laticeps* from Quinto River (CFA-IC-3882). **E:** *Corydoras paleatus* Quinto River (CFA-IC-387). The scale is 1 cm.

Diamante rivers from the west. From 36° S, the main course enters La Pampa province and is renamed as Salado River. In La Pampa, the Salado basin receives the Atuel River with which it forms the Atuel Wetland. From this area, the main channel is called Chadileuvu River, whose waters, during periods of flood, can flow into the Curaco River and then into the Atlantic via the Colorado River. However, the flow of this drainage in La Pampa province is minimal due to anthropogenic changes and to intensive use of its waters (Lastiri 2012).

Previous records. Burmeister (1861) made reference to the presence of *Percichthys trucha* and a species of Silverside, *Basilichthys cuyanus*, both from the Guanacache lagoons and commercialized for human consumption in Mendoza City. Mac Donagh (1950) cited *Percichthys trucha* and Goldfish, *Carassius auratus,* from this lagoon (Mac Donagh 1950; Villanueva and Roig 1995). Subsequently, Ringuelet et al. 1967 reaffirmed the presence of one species of Southern Silverside in Guanacache lagoons, but he considered *B. cuyanus* as a junior synonym of *Basilichthys microlepidotus*. Dyer (1998) synonymized the multiple classifications of the Patagonian Silverside, including *B. cuyanus* and *B. microlepidotus* as junior synonyms of *Odontesthes hatcheri*, and considered their presence in the Desaguadero basin in San Juan and Mendoza provinces as the northernmost records for this species (Dyer 2000). Arratia et al. 1983 cited the presence of *Hatcheria macraei* for this basin in Mendoza and La Rioja provinces. Also, they cited *Diplomystes cuyanus* for the basin of the San Juan River, a tributary in the Desaguadero Basin.

New records. The samplings were carried out in: Desaguadero River and route 146 (34°05′13.04″ S, 066°42′35.98″ W; Figure 1, locality 19) and Desaguadero River and route 7 (33°24′38.60″ S, 067°07′47.80″ W; Figure 1, locality 12). We only reported *Jenynsia multidentata* (CFA-IC-3840 and 3880). The low flow of the river at these sites and the consequent high salinity promote the proliferation of this species, possibly at the expense of others.

San Luis–Bebedero Basin

Bebedero River. This river flows in a south to north direction and drains to the Salinas del Bebedero. Because the headwaters of this river are very close to the Desaguadero River, Gerth (1914) postulated that, formerly, the Bebedero River flowed from the Bebedero Lake (where the Salinas are currently located), towards the Desaguadero River. According to his hypothesis, a later desertification would have dried the lake (forming the Salinas) and inverted the flow of the river (Gerth 1914; Deletang 1929). According to recent geological studies, the Salinas del Bebedero formed a large freshwater lake during the Quaternary glacial periods and desiccated during the interglacial periods (González 1981; Gonzalez and Maidana 1998).

Previous records. There are no ichthyological references for Bebedero River, but there is one striking comment made by Martín de Moussy for the Bebedero Lake: "The Bebedero provides salt throughout the province and nourishes very good fish" (translated from de Moussy 1864: 475). Later, he added: "There are few fish in the rivers, they are very torrential for feeding; being the Bebedero Lake the only one that provides them"

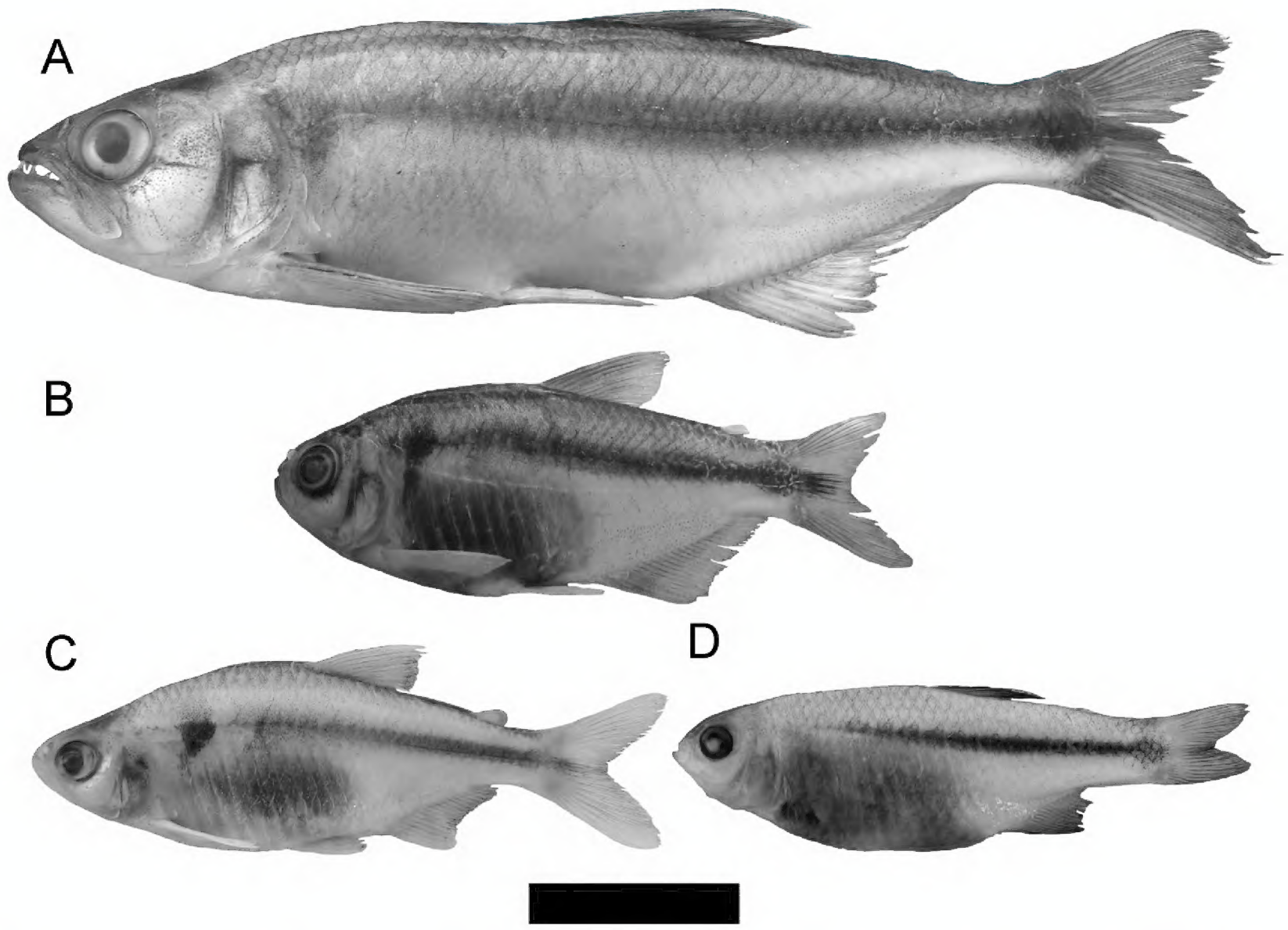

Figure 4. A: *Oligosarcus jenynsii* from Quines River (CFA-IC-3935). **B**: *Astyanax eigenmanniorum* from Conlara River (CFA-IC-3893). **C:** *Bryconamericus iheringii* from Quinto River (CFA-IC-3877). **D** *Cheirodon interruptus* from Nogolí River (CFA-IC-3971). The scale is 1 cm.

(translated from de Moussy 1864: 479). Unfortunately, de Moussy does not give more details.

New records. The samplings were carried out in the main channel of the river at the intersection with route 11 near Beazley (33°45.688′ S, 066°34.445′ W; Figure 1, locality 14). Only *Jenynsia multidentata* (CFA-IC-3839 and 3879) was collected.

Chorrillos–San Luis River. The headwaters of Chorrillos River are composed of numerous rivers, which run downstream from the southeast foothills of the Sierra de San Luis to the Cruz de Piedra Reservoir. After the dam, the basin receives the waters of Las Chacras River and gets the name of Chorrillos or San Luis River. Downstream, towards the southwest, there is still a small dam named Chico. After several kilometres in southwest direction, the river is lost in the Salinas del Bebedero.

Previous records**.** Ringuelet et al. (1967) cited *Trichomycterus corduvensis* and *T. tenuis* from the headwaters of this basin, in the Durazno, Volcano and Potrero de Funes streams. Ferris (1996) recorded *J. multidentata* and *Gambusia affinis* from Potrero de Funes Stream.

New records. Samples were collected in San Luis City (33°18′08.8″ S, 066°18′47.4″ W; Figure 1, locality 8), where *Trichomycterus tenuis* (CFA-IC-3972) and *Gambusia affinis* (specimens not preserved) were collected.

Nogolí River. The Nogolí River originates at the confluence of El Molle and Chico rivers in the northeastern Sierras de San Luis. This river then flows into the Nogolí Dam, constructed in December 2000. The waters of this dam cover 140 ha and are used to supply drinking water, irrigation, and livestock. The average flow is 1,145 m^3/s and its depth is 50 m. Beyond the dam the Nogolí River flows to the south infiltrating the ground before reaching the Salinas del Bebedero.

Previous records**.** Ferriz (1996) revealed the presence of *Trichomycterus corduvensis* collected at Nogolí village. This is the only species known for this basin.

New records. Samples were collected upstream of the Nogolí Dam (32°56′35.1″ S, 066°15′45.9″ W; Figure 1, locality 7). We recorded *Jenynsia multidentata* (CFA-IC-3940), *Gambusia affinis* (CFA-IC-3970), *Cheirodon interruptus* (CFA-IC-3971), *Astyanax eigenmanniorum* (CFA-IC-3941), *Trichomycterus corduvensis* (CFA-IC-3942), and the exotic species, *Oncorhynchus mykiss* (CFA-IC-3943).

Quinto Basin

The Quinto River is located in the central-eastern part of San Luis province, with a portion continuing east into Córdoba province. At its upper stretch, the steep slopes have facilitated the construction of numerous dams. The Quinto River is the largest river in San Luis province, draining an area of approximately 1,800 km^2. The Quinto River flows north to south and then shifts

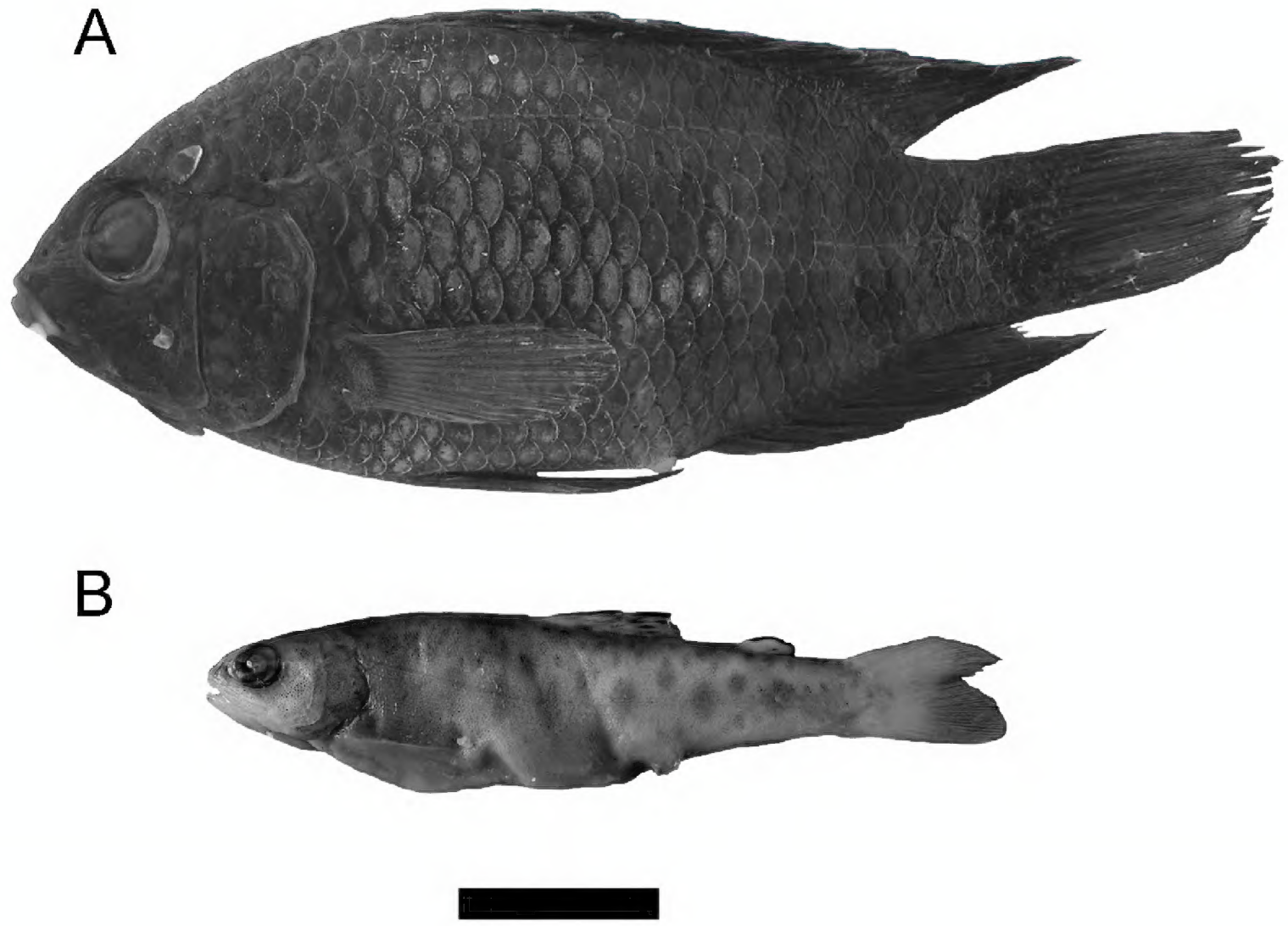

Figure 5. A: *Australoheros facetus* from Luján River (CFA-IC-3926). **B:** *Oncorhynchus mykiss* from Nogolí River (CFA-IC-3943). The scale is 1 cm.

towards the southeast. It crosses a wide plain and flows through southern Córdoba province and continues to the Amarga Wetland. In this area, during periods of drought, the river disappears at the surface, but during high rainfall periods, it drains a considerable area, reaching as far as Santa Fe, La Pampa, and Buenos Aires provinces. The Quinto River occasionally makes contact with watercourses associated with the Salado basin in Buenos Aires province (Ceci and Cruz Coronad 1981; Menni 2004). The superficial connection between the Quinto and Salado rivers has been reactivated through the artificial channel Arturo Jauretche (Ministerio de Infrastructura de la Provincia de Buenos Aires 2015). Because this new channel altered the natural runoff of the Quinto River, it can no longer be considered as a strictly endorheic basin.

Previous records**.** This is the best-studied basin of San Luis province, containing the most diverse ichthyofauna in the province, with 18 species (Garelis and Bistoni 2010). These authors reported *Astyanax eigenmanniorun, Bryconamericus iheringii, Cheirodon interruptus, Hoplias malabaricus, Pimelodella laticeps, Rhamdia quelen, Corydoras paleatus, Hypostomus cordovae, Trichomycterus corduvensis, Trichomycterus tenuis, Jenynsia multidentata, Cnesterodon decemmaculatus,* and *Australoheros facetus*. In addition, the following introduced species are known: *Carassius auratus, Cyprinus carpio, Oncorhynchus mykiss, Gambusia affinis* and *Odontesthes bonariensis* (Ringuelet et al. 1967; Ringuelet 1975; Menu-Marque et al. 1983; Menni et al. 1984; López et al. 1994; Ferriz 1996; Menni 2004; Haro and Bistoni 2007; Garelis and Bistoni 2010).

New records. The samplings were carried out at eight different sites: on route 14 (33°55′07.70″ S, 065°09′03.40″ W; Figure 1, locality 18), at Bajo Vara in Justo Daract (33°51′24.06″ S, 0065°12′33.20″ W; Figure 1, locality 17), on route 11 (33°50.258′ S, 065°14.577′ W; Figure 1, locality 16), in Villa Mercedes (33°41.996′ S, 065°27.993′ W; Figure 1, locality 15), on route 27 near Fraga (33°26.444′ S, 065°47.529′ W; Figure 1, locality 13), at Paso de las Carretas Dam (33°19′51.9″ S, 065°52′15.7″ W; Figure 1, locality 11), upstream of the Paso de las Carretas Dam and on route 20 (33°15.455′ S, 066°0.389′ W; Figure 1, locality 9), and on route 20 (33°15′24.51″ S, 066°00′27.51″ W; Figure 1, locality 10). We collected: *Oligosarcus jenynsii* (CFA-IC-3963), *Bryconamericus iheringii* (CFA-IC-3877, 3890, 3961 and 3966), *Cheirodon interruptus* (CFA-IC-3878, 3956, 3962 and 3964), *Astyanax eigenmanniorum* (CFA-IC-3836, 3888, 3957 and 3965), Characidae sp. (CFA-IC-3967), *Pimelodella laticeps* (CFA-IC-3882), *Corydoras paleatus* (CFA-IC-3876 y 3881), *Australoheros facetus* (CFA-IC-3891 and 3955), *Jenynsia multidentata* (CFA-IC-3838, 3883, 3885, 3958 and 3959), *Cnesterodon decemmaculatus* (CFA-IC-3887 and 3960), and *Gambusia affinis* (CFA-IC-3837, 3884, 3886 and 3892). At some points along this river, we found *Cyprinus carpio* (specimens not preserved). The catfish *Trichomycterus corduvensis* (CFA-IC-3889) was only found in the basin upper streams.

Conlara Basin

The Conlara River has its origin in the center-east of the Sierras de San Luis (Ceci and Cruz Coronado 1981).

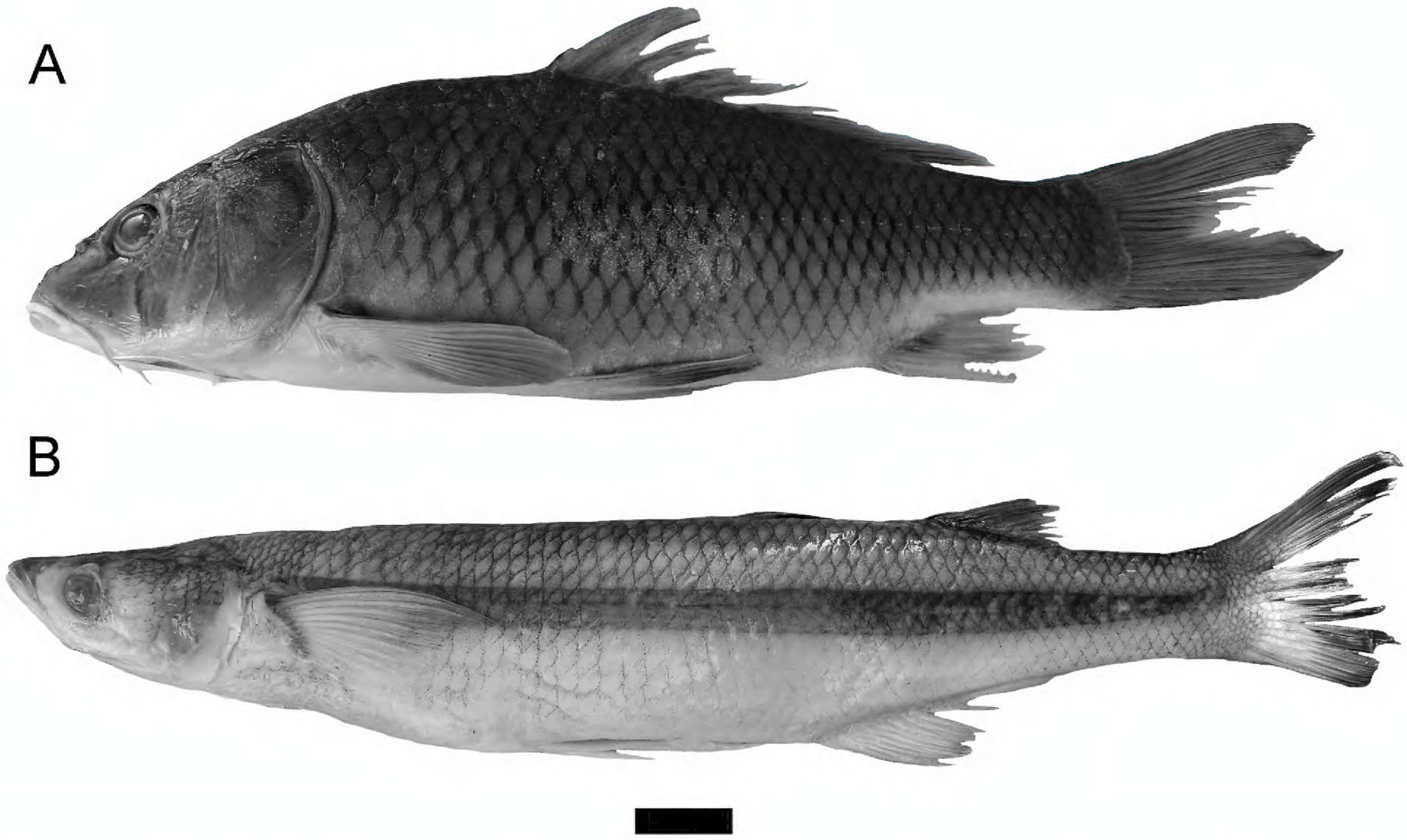

Figure 6. A: *Cyprinus carpio* from Conlara Basin (CFA-IC-3973). **B:** *Odontesthes bonariensis* from Conlara Basin (CFA-IC-3924). The scale is 1 cm.

It receives Los Molles and Piedras Bayas rivers that come together in the San Felipe Reservoir (1,200 ha). The Conlara River then flows north along a fault line, passing through the cities of Renca, Tilisarao, San Pablo and Concarán. In this area the Guanaco Pampa River flows from the west into the Conlara River, which then flows through the city of Santa Rosa del Conlara and finally into the Bañados de Las Cañadas.

Previous records. Ringuelet et al. (1967) described the presence of *Jenynsia obscura* (= *J. pygogramma*), based on 35 specimens from Concarán (MLP-II-60-15 Museo de La Plata). This is the only taxon known for this large basin. Unfortunately, this material has been discarded (3 March 1983) from the collection of the Museo de La Plata, and its examination was not possible.

New records. Four sites were sampled: San Felipe Dam (32°48′37.7″ S, 065°27′42.3″ W; Figure 1, locality 6), Guanaco Pampa River in Villa Praga (32°32′29.1″ S, 065°38′47.2″ W; Figure 1, locality 4), Concarán (32°33.511′ S, 065°15.162′ W; Figure 1, locality 5) and Santa Rosa de Conlara (32°20′25.07″ S, 065°12′46.47″ W; Figure 1, locality 3). We reported the following species: *Bryconamericus iheringii* (CFA-IC-3842, 3896 and 3925), *Astyanax eigenmanniorum* (CFA-IC-3843, 3893 and 3951), *Cheirodon interruptus* (CFA-IC-3895 and 3969), *Rhamdia quelen* (CFA-IC-3899), *Australoheros facetus* (CFA-IC-3894), *Jenynsia multidentata* (CFA-IC-3841, 3897, 3900 and 3950), *Cnesterodon decemmaculatus* (CFA-IC-3898 and 3968). In the San Felipe Reservoir the silverside *Odontesthes bonariensis* (CFA-IC-3924) and the carp *Cyprinus carpio* (CFA-IC-3973 and 3974) were abundant.

Llanura Norte Basin

The Llanura Norte Basin is located in the north sector of Sierras de San Luis. This basin has three main drainages (Quines, San Francisco and Luján rivers) flowing independently from one another, whose headwaters are located at the western slope of the Sierras de San Luis.

Quines River. The source of the Quines River is on the western slope of the Sierras de San Luis, at the confluence of three streams downstream of the town Las Chacras. The river is dammed: La Huertita Dam, opened in 1981 for irrigation and for power, is 430 ha (Colazo 2014); a second dam, El Muro, is a few kilometres upstream of the city of Quines. At Quines, the river is channelled and used for human consumption and agricultural activities.

Previous records. There are none.

New records. Samples were collected in Huertita Dam (32°24′56.3″ S, 065°43′18.2″ W; Figure 1, locality 2). We recorded: *Oligosarcus jenynsii* (CFA-IC-3935), *Bryconamericus iheringii* (CFA-IC-3939), *Astyanax eigenmanniorum* (CFA-IC-3938), *Cheirodon interruptus* (CFA-IC-3937), *Pimelodella laticeps* (CFA-IC-3934), *Corydoras paleatus* (CFA-IC-3932), *Australoheros facetus* (CFA-IC-3933), *Odontesthes bonariensis* (CFA-IC-3975) and *Jenynsia multidentata* (CFA-IC-3936).

Luján River. This river flows in a wide and steep ravine in one of the steepest parts of the Sierra de San Luis. Luján River originates at the confluence of San Lorenzo and Las Palmitas rivers near the city of Mesilla del Cura. A few kilometres upstream of Luján Town, is the Luján Dam, built in 1958 for drinking water and agricultural use (Colazo 2014). The reservoir covers an area of 27 ha. Downstream of this dam, there is little flow and the

Luján River forms a series of interconnected natural pools and then disappears into the ground.

Previous records. There are none.

New records. The samplings were carried out downstream from Luján Dam (32°23′46.9″ S, 065° 54′48.1″ W; Figure 1, locality 1). We collected: *Oligosarcus jenynsii* (CFA-IC-3944), *Astyanax eigenmanniorum* (CFA-IC-3931 y 3954), *Cheirodon interruptus* (CFA-IC-3930 and 3953), *Australoheros facetus* (CFA-IC-3901 y 3926), *Odontesthes bonariensis* (CFA-IC-3927), *Jenynsia multidentata* (CFA-IC-3928 y 3952) and *Gambusia affinis* (CFA-IC-3929).

DISCUSSION

Our recent samplings were developed on six independent basins of San Luis province and provided 34 new records of freshwater fish distribution. These data allowed us to provide a new list of fish species for this province.

We cite for the first time *Jenynsia multidentata* from the Desaguadero River. The low water level linked with the high rate of hard water and generation of dams upstream in this basin favours water salinization, considerably restricting the proliferation of other fish species.

On the Bebedero River, we collected *J. multidentata*, which is now the only species known in the San Luis drainage south of the Salinas del Bebedero.

From the Chorrillos River, we confirmed the presence of *Trichomycterus tenuis* previously cited for the upper drainage by Ringuelet (1967) but considered unconfirmed by Nadalin et al. (2015). We also add the exotic species, *Gambusia affinis*.

We recorded a plentiful population of *Trichomycterus corduvensis* for the Nogolí River, as had been previously quoted by Ferris (1996). We also add *Jenynsia multidentata*, *Gambusia affinis*, *Cheirodon interruptus*, *Astyanax eigenmanniorum*, and the exotic *Oncorhynchus mykiss* to the list of fishes from the Nogolí River.

This study provides, for the first time, a list of the fish fauna of the Conlara Basin, consisting of nine species that had not been previously recorded. Two of them, *Gambusia affinis* and *Cyprinus carpio*, are introduced exotic species. The Silverfish, *Odontesthes bonariensis,* originally from the Río de la Plata Basin, has been introduced to San Luis province to promote sport fishing. More systematic sampling is required to affirm the presence of *J. obscura* in the Conlara Basin. Strong anthropogenic modifications (introduction of exotic species, pollution, and waterworks) have changed the dynamics of this basin considerably since the second half of the 20th century. These modifications may be responsible for the disappearance of this endemic species. However, we confirmed the presence of another species from the genus, *J. multidentata,* at four localities in this river basin.

We also provide a list of species for the Luján and Quines basins, with seven and nine species respectively. The effects of the dams on ichthyologic biodiversity is difficult to assess because there were no previous ichthyologic records from before the dams to compare with.

Here, we present the first record of *Oligosarcus jenynsii* in the Luján, Quines and Quinto basins. This species was recorded by Mancini et al. (2009) from one of the six lakes located south of Villa Mercedes in San Luis province. Quinto River is the closest basin to these lakes but it showed no records of *Oligosarcus*. We have analysed several specimens of this species collected by one of us (YPC) on 2–3 November 2011 in Quinto River near Villa Sarmiento, in Córdoba (CFA-IC-3068, 32°11.816′ S, 064°28.789′ W; Figure 1, locality 20). This material confirms the presence of *O. jenynsii* in Quinto River in San Luis and Córdoba provinces and also expands the known distribution of this species to two endorheic streams in the northwestern side of the Sierras de San Luis.

The presence of carp (*Cyprinus carpio*) had been already reported in San Luis province (MacDonagh 1948; Ringuelet et al. 1967). Lakes near Villa Mercedes were the first places where this species was introduced, and probably, the first specimens came from the Palermo lakes in Buenos Aires, where in 1930, after draining these lakes, carp were moved to the Botanical Garden and other places in Argentina (MacDonagh 1948). Carp are native to the Black and Caspian seas and Turkestan (Miquelarena et al. 1997) but it was during the Roman Empire that they were introduced in Europe. In America, where it quickly spread, may have been introduced since the beginning of the 20th century. Carp is extremely detrimental to native species, generating the displacement of other fishes (Chébez and Rodríguez 2013). We have seen it thriving in San Luis province, where it is the dominant fish in the San Felipe Reservoir (Conlara drainage). Another exotic species is the Goldfish, *Carassius auratus* (MacDonagh 1950; Baigún and Quiros 1985; Menni 2004). However, we did not find this species, which suggests that it is not highly invasive. Rainbow Trout (*Oncorhynchus mykiss*) was introduced for sporting purposes, but during our sampling, it was only detected in the Nogolí River. *Gambusia affinis* was introduced from the United States as a biological agent for control of mosquitoes, and although this fish has a wide distribution in San Luis province, it does not appear to have a major effect on native species and shares an ecological niche with species *Jenynsia* and *Cnesterodon*.

Although river systems of San Luis province have been included within the Brazil Sub-region of the Paranense Domain (Ringuelet 1975; Arratia et al. 1983; López et al. 2002; López et al. 2008), they have been considered one of the poorest in species diversity within

this domain (Menni 2004). The 34 new distribution records presented here provide new data that allows us to rethink this assumption.

ACKNOWLEDGEMENTS

We thank Florencia Tessano of the Programa Biodiversidad (Ministerio de Medio Ambiente, Provincia de San Luis) for helping us to obtain the permits to collect and Valeria Bauni of the Fundación de Historia Natural Félix de Azara for the preparation of the map. We also thank the Fundación de Historia Natural Félix de Azara for their invaluable collaboration. Part of the sampling work was supported by Fondos iBOL-Argentina (CONICET).

LITERATURE CITED

Arratia, G.F., M.B. Peñafort and S. Menu-Marque. 1983. Peces de la región sureste de los Andes y sus probables relaciones biogeográficas. Deserta 7: 48–107.

Baigún, C. and R. Quirós. 1985. Introducción de peces exóticos en la República Argentina. Serie Informe Técnico INIDEP Aguas Continentales 3: 1–90.

Bistoni, M.A., J.G. Haro and M. Gutiérrez. 1996. Ictiofauna del río Quinto (Popopis) en la provincia de Córdoba (Argentina). Asociación de Ciencias Naturales del Litoral 27: 43–48.

Burmeister, C. G. 1861. Reise durch die La Plata-Staaten mit besonderer Rücksicht auf die physische Beschaffenheit und den Culturzustand der Argentinischen Republik. Schmidt Halle (Ed.). Berlin: vol. 2. 536 pp.

Ceci, J.H. and M.D. Cruz Coronado. 1981. Recursos hídricos subterráneos; pp. 301–322, in: VIII Congreso Geológico Argentino (ed.). Geología y Recursos Naturales de la Provincia de San Luis. San Luis.

Chébez, J. C. and Rodríguez, G. 2013. La fauna gringa: especies introducidas en Argentina. Vázquez Mazzini (ed.). Buenos Aires: Fundación de Historia Natural Félix de Azara. 224 pp.

Criado Roque, P., Mombrú, C. and Ramos, V. 1981. Estructura e interpretación tectónica, pp. 155–192, in: M. Yrigoyen (Ed.). Geología de la provincia de San Luis. Relatorio. Buenos Aires: 8vo Congreso Geológico Argentino.

Colazo, J.C. 2014. Recursos físicos y ambientales de los territorios de la provincia de San Luis. Documento base actualizado para el documento Propuesta de desarrollo regional y territorial para la provincia de San Luis. Plan tecnológico regional 2012–2019. 23 pp.

Deletang, L. F., 1929. Salinas. Contribución al estudio de las salinas argentinas. La Salina del Bebedero y sus relaciones con el sistema hidrográfico andino o del Desaguadero, Provincia de San Luis. Buenos Aires: Dirección General Mineralogía Geología e Hidrol. no. 47.

Dyer, B. S. 1998. Phylogenetic systematics and historical biogeography of the Neotropical silverside family Atherinopsidae (Teleostei, Atheriniformes); pp. 519–536, in: L.R. Malabarba, R.E. Reis, R.P. Vari, Z.M. Lucena and C.A.S. Lucena (eds.). Phylogeny and classification of Neotropical fishes. Porto Alegre: Edipucrs. 603 pp.

Dyer, B.S. 2000. Revisión sistemática de los pejerreyes de Chile (Teleostei, Atheriniformes). Estudios Oceanológicos 19: 99–127.

Ferriz, R.A. 1995–1996. Aporte al conocimiento de la ictiofauna de la provincia de San Luis (Argentina). Bioikos 9–10: 32–34.

Garelis, P.A. and Bistoni, M.A. 2010. Ictiofauna de la cuenca endorreica del río Quinto (San Luis, Argentina). Natura Neotropicalis 41 (1/2): 19–30.

Gerth, E., 1914. Constitución geológica, hidrogeológica y minerales de aplicación de la provincia de San Luis. Anales Ministerio Agricultura, Sección Geología, Mineral y Minería 10 (2): 1–64.

González, M. 1981. Evidencias paleoclimáticas en la salina del Bebedero (San Luis). VIII Congreso Geológico Argentino. Actas 3: 411–438.

González, M. and Maidana, N. 1998. Post-Wisconsinian paleo-environments at Salinas del Bebedero basin, San Luis, Argentina. Journal of Paleolimnology 20: 353–368. doi: 10.1023/A:1008016821250

Haro, J.G. and M.A. Bistoni. 2007. Peces de Córdoba. Córdoba: Universidad Nacional de Córdoba. 264 pp.

Lastiri, N.P. 2012. Gestión de las cuencas hidrográficas: Conflicto inter jurisdiccional por las aguas del río Atuel. La Pampa: Fundación Internacional y para Iberoamérica de Administración y Políticas Públicas (FIIAPP). 18 pp.

López, H.L., R.C. Menni and L.C. Protogino. 1994. Bibliografía de los peces de agua dulce de Argentina y Uruguay. Suplemento 1993, 1–20, in: Situación Ambiental de la Provincia de Buenos Aires. Buenos Aires: A. Recursos y rasgos naturales en la evaluación ambiental 4.

López, H.L., C.C. Morgan and M.J. Montenegro. 2002. Ichthyological ecoregions of Argentina. ProBiota 1: 1–70.

López, H.L., L.C. Protogino and A.E. Aquino. 1996. Ictiología continental de la Argentina: Santiago del Estero, Catamarca, Córdoba, San Luis, La Pampa y Buenos Aires. Aquatec 3: 1–14.

López, H., R. Menni, M. Donato and A. Miquelarena. 2008. Biogeographical revision of Argentina (Andean and Neotropical Regions): an analysis using freshwater fishes. Journal of Biogeography 35: 1564–1579. doi: 10.1111/j.1365-2699.2008.01904.x

Mac Donagh, E.J. 1948. Sobre la cría de carpas y pejerreyes en la provincia de San Luis. Notas del Museo de La Plata 13, Zoología 114: 313–325.

Mac Donagh, E.J. 1950. Las razas de percas o truchas criollas (*Percichthys*) y su valor para la repoblación pesquera. Revista del Museo de La Plata, Zoología 39 (6): 71–170.

Mancini M., V. Salinas and J. G. Haro. 2009. Diferentes aspectos ecológicos e ictiofauna de seis lagunas mercedinas (provincia de San Luis, Argentina). Biología Acuática 26: 151–165.

Menni, R.C. 2004. Peces y ambientes en la Argentina continental. Monografías del Museo Argentino de Ciencias Naturales de La Plata 5: 316 pp.

Menni, R.C., H.L. López, J.R. Casciotta and A.M. Miquelarena. 1984. Ictiología de áreas serranas de Córdoba y San Luis (Argentina). Biología Acuática 5: 1–63.

Menú-Marque S.A., Fernández, H.F. and M.B.M. González. 1983. Estudio limnológico del embalse La Florida-San Luis. San Luis: Dirección Nacional de Pesca Continental y Subsecretaria de Estado de Asuntos Agrarios. 15 pp.

Ministerio de Infrastructura de la Provincia de Buenos Aires. 2015. Sub-Secretaría de Obras Públicas. http://www.mosp.gba.gov.ar/subsecretarias/subOpu.php, 10 December 2014.

Miquelarena, A., López, H. and L. C. Protogino. 1997. Los peces del Neuquén. Buenos Aires: Total Austral S.A. 50 pp.

Morisoli E. 2007. Temas Pampeanos. Recursos Hídricos medio ambiente e historia. Fundación Chadileuvú. Editorial Biblioteca Pampeana. 43–50 pp.

de Moussy, M. 1864. Description géographique et statistique de la Confédération Argentine. Vol. 3. Paris: Librerie Firmín Didot. 752 pp.

Nadalin D., P. Garelis, L. Fernández, G. Bustamente and H. López. 2015. Lista de peces de la provincia de San Luis. *ProBiota*, FCNyM, UNLP, La Plata, Argentina, Serie Técnica y Didáctica 32: 1–12.

Ringuelet, R.A. 1975. Zoogeografía y ecología de los peces de aguas continentales de la Argentina y consideraciones sobre las áreas ictiológicas de América del Sur. Ecosur 2: 1–122.

Ringuelet, R.A., R.H. Arámburu and A.S. Alonso de Arámburu. 1967. Los peces argentinos de agua dulce. La Plata: Comisión de Investigaciones Científicas de la Provincia de Buenos Aires. 602 pp.

Rodríguez, N., N. Navarro Becerra, F.D. Cid, R.L. Antón and E. Caviedes-Vidal. 2005. Levels of organochlorines in *Odonthestes bonariensis* during different reproductive stages in La Florida (San Luis, Argentina). Biocell 29: 377.

Sverlij, S.B. and J.P. Mestre Arceredillo. 1991. Crecimiento del pejerrey, *Odontesthes bonariensis* (Pisces, Atheriniformes) en el embalse La Florida, San Luis, Argentina. Revue d'Hydrobiolgie Tropicale 24: 183–195.

Villanueva, M. and V. Roig. 1995. La ictiofauna de Mendoza. Reseña histórica, introducción y efectos de especies exóticas. Multequina 4: 93–104.

Authors' contribution statement: YC, SB, JM, AJ, MC, collected the fishes and data and, wrote the text, ML wrote the text and SB identified the specimens.

Received: 25 June 2015
Accepted: 9 September 2015
Academic editor: Tiago P. Carvalho
Published on 4 October 2015; revision with minor text corrections published on 6 October 2015.